

the average of the seam, with some concentration in the peas and pearls, and more in the dross. Unwashed drosses are sometimes compressed into briquettes with or without addition of a binding agent for use in steam.

The following analyses exemplify these types of fuel.

	Lanarkshire Washed Single Nut8.	Dross supplied to Electricity Station (Scotland).	Peas supplied to Electricity Station (London).	DiThvs h Slack.	
Carbon	66.22%	56.23%	60.38%	72.4	
Hydrogen	1.58	1.72	1.45	4.06	
Oxygen	6.93			1	11 5'1K
Nitrogen	1.56		8.67		#
Sulphur	0.22	—		1.17	15.00
Moisture	13.42	14.27	12.30	6.74	
	100.00	100.00	100.00	100.00	too 00
Volatile matter	32.31%	30.65%	30.52%	
Fixed carbon	17.52	22.15	43.18		
B.Th.U. per lb.	—	10,366	10,904	12,77	5

* Not determined.

Coal Ash.—The non-combustible matter, or ash, of coal varies greatly in amount and likewise in composition. The basis of it consists generally of silica and alumina in combination, but there are also present lime, magnesia, alkalis, and iron, sometimes in considerable quantity. Iron present as pyrites becomes converted into oxide during combustion, and carbonate of lime, sometimes found as a deposit in the cleavages of the coal, is calcined at the same time to quicklime. The composition of the ash is important as it determines the fusibility and therefore the tendency to clinker on the tire bars. With few exceptions the ashes of coals may be said to lie within the following limits of composition:

	Per cent.
Silica ..	25 s;6
Alumina ..	17-35
Oxide of iron ..	fj 29
Lime
2-20	
Magnesia	i 10
Sulphuric anhydride ..	i 3

When it is constituted by silicate of alumina with little admixture, the ash is not readily softened by heat, nor does the addition of lime alone exercise a marked influence in this direction. Silica alone melts at about 1700° and compounds of silica, alumina, and lime containing nearly 40 per cent of the last named have melting-points in the neighbourhood

of 2730 F. ami
over. The oxides of iron have a much more decided action
than lime in
lowering the melting-point, and this is particularly the
case with the Inurr
oxide (FeO), which in moderate percentages produces a
distinct tendency to
clinker. Experience has been cited which shows that up
to 8 per cent of